




RF Exposure Evaluation

FCC ID: Q3N-1664A
IC: 5121A-1664A
APPLICANT: CIPHERLAB CO., LTD.
Application Type: Certification
Product: BT Barcode Scanner
Model No.: 1664 A
Serial Mode No.: 1662 A
Trademark: 
FCC Rule Part(s): Part 2.1091 (Mobile)
IC Standard: RSS 102 (issue5)
Test Date: June 17, 2021
Tested By : *Peter Syu*
(Peter Syu)
Reviewed By : *Paddy Chen*
(Paddy Chen)
Approved By : *Chenz Ker*
(Chenz Ker)



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standards through the calibration of the equipment and evaluated measurement uncertainty herein.


The test report shall not be reproduced except in full without the written approval of MRT Technology (Taiwan) Co., Ltd.

Revision History

Report No.	Version	Description	Issue Date	Note
2104TWD701-U3	1.0	Original Report	2021-06-21	

1. PRODUCT INFORMATION

1.1. Equipment Description

Product Name	BT Barcode Scanner
Model No.	1664 A
Serial Mode No.	1662 A
Trademark	
Supports Radios Spec.	Bluetooth: V2.1+EDR
Frequency Range	2402~2480MHz
Type of Modulation	FHSS (GFSK, $\pi/4$ DQPSK, 8DPSK)
Data Rate	1Mbps (GFSK), 2Mbps ($\pi/4$ DQPSK), 3Mbps (8DPSK)

Note:

1. Model Difference: Only the scanner lens of the product is different, the RF hardware are identical. (declared by the manufacturer)
2. The test was performed base on 1662 A.

1.2. Antenna Description

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	CIPHERLAB CO., LTD.	KX01664241007	PIFA	3.14dBi

2. RF Exposure Evaluation

2.1. FCC Limits

According to FCC KDB 447498 Section 4.3 - General SAR test exclusion guidance

For 100 MHz to 6 GHz and test separation distances ≤ 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$ for 1-g SAR, and ≤ 7.5 for 10-g extremity SAR,

where

1. $f(\text{GHz})$ is the RF channel transmit frequency in GHz
2. Power and distance are rounded to the nearest mW and mm before calculation
3. The result is rounded to one decimal place for comparison
4. The values 3.0 and 7.5 are referred to as numeric thresholds in step b) below

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm, and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm according to 4.1 f) is applied to determine SAR test exclusion.

2.2. IC Limits

Output power level shall be the higher of the maximum conducted or equivalent isotropically radiated power (e.i.r.p.) source-based, time-averaged output power. For controlled use devices where the 8 W/kg for 1 gram of tissue applies, the exemption limits for routine evaluation in Table 1 are multiplied by a factor of 5. For limb-worn devices where the 10 gram value applies, the exemption limits for routine evaluation in Table 1 are multiplied by a factor of 2.5. If the operating frequency of the device is between two frequencies located in Table 1, linear interpolation shall be applied for the applicable separation distance. For test separation distance less than 5 mm, the exemption limits for a separation distance of 5 mm can be applied to determine if a routine evaluation is required.

Frequency (MHz)	Exemption Limits (mW)				
	At separation distance of ≤ 5 mm	At separation distance of 10 mm	At separation distance of 15 mm	At separation distance of 20 mm	At separation distance of 25 mm
300	71 mW	101 mW	132 mW	162 mW	193 mW
450	52 mW	70 mW	88 mW	106 mW	123 mW
835	17 mW	30 mW	42 mW	55 mW	67 mW
1900	7 mW	10 mW	18 mW	34 mW	60 mW
2450	4 mW	7 mW	15 mW	30 mW	52 mW
3500	2 mW	6 mW	16 mW	32 mW	55 mW
5800	1 mW	6 mW	15 mW	27 mW	41 mW
Frequency (MHz)	At separation distance of 30 mm	At separation distance of 35 mm	At separation distance of 40 mm	At separation distance of 45 mm	At separation distance of ≥ 50 mm
≤ 300	223 mW	254 mW	284 mW	315 mW	345 mW
450	141 mW	159 mW	177 mW	195 mW	213 mW
835	80 mW	92 mW	105 mW	117 mW	130 mW
1900	99 mW	153 mW	225 mW	316 mW	431 mW
2450	83 mW	123 mW	173 mW	235 mW	309 mW
3500	86 mW	124 mW	170 mW	225 mW	290 mW
5800	56 mW	71 mW	85 mW	97 mW	106 mW

Table 1: SAR evaluation – Exemption limits for routine evaluation based on frequency and separation distance.

2.3. Test Result of RF Exposure Evaluation

Mode	Frequency Band (MHz)	Output Power (dBm)	Output Power (mW)	FCC SAR Test Exclusion Threshold (mW) @5mm	Antenna Gain (dBi)	EIRP (mW)	IC SAR Test Exclusion Threshold (mW) @5mm
BLE	2402~2480	5	3.16	25	3.14	6.52	10

So, this device can complies the SAR test exclusion.

Note:

1. For limb-worn devices where the 10 gram value applies, the exemption limits for routine evaluation are multiplied by a factor of 2.5.

_____ The End _____